

REMARKS/ARGUMENTS

Reconsideration of the above-identified application is respectfully requested in view of the foregoing amendments and the following remarks.

The abstract of the disclosure has been amended to correct a misspelling on line 5, as pointed out by Examiner Basinger.

The first paragraph on the first page of the specification, line 4, has been revised to indicate that the parent application of which the instant application is a Continuation-in-Part, is now abandoned.

Claims 1, 7, 10 and 11 have been currently amended. Claims 2, 3, 9, 12, and 13 have been cancelled. Claims 1, 4-8, 10, and 11 remain in the case.

Support for amended claims is found throughout the specification and in the original claims. Specific support is shown below.

Support for the inclusion of the term "containment and dispensing device being internally incorporated into said rescue flotation buoy" in Claim 1 is found in the specification page 3, lines 20-23, and page 5, lines 9-11, 16-19.

Support for the inclusion of the term "wherein each one of said multiple applications is effective in repelling a shark" in Claims 1, 7, and 11 is found in the specification page 6, lines 16-22, and page 7, lines 1-9.

This invention is a rescue flotation buoy integrated with a pressurized containment and dispensing device containing a pressurized repellent for sharks. The invention is designed to utilize sodium lauryl sulfate, a well-known surfactant shark repellent, as one such repellent material. Additionally, the invention is designed specifically so that multiple ejections of a surfactant repellent can be made in order to sufficiently repel a shark attack in a rescue situation.

Claims 1, 4, 5 and 6 were rejected under 35 U.S.C. §103(a) as being unpatentable over ILER in view of GB 2 176

732A and SCHNEIDER. GB 2 176 732A is said to disclose a pressurized repellent material containment and dispensing device 1 having a proximal end and a distal end for serially dispensing multiple applications of shark repellent material. It was previously argued that: "Multiple applications of specific repellent materials, including sodium lauryl sulfate, would require a significantly larger storage chamber." Examiner Basinger stated that this argument was not persuasive because: "in Schneider [U.S.P. 4,602,384] column 2, lines 33 - 37 it is disclosed that sodium lauryl when mixed with sea water can kill a shark in only small quantities. Because sodium lauryl can kill in small quantities when mixed with sea water, the capacity chamber 11 of the knife of GB 2 176 732A can hold an amount of sodium lauryl which is sufficient to kill a shark as it would hold a small quantity of any shark repellent."

The term "small quantities" is a relative word, however. More recent research, published 15 years after the referenced '384 patent of SCHNEIDER, shows that a much larger amount of sodium lauryl sulfate would be needed to effectively repel a shark than could possibly fit in the handle of a dive knife.

This more recent research can be found in the journal article entitled Surfactants as chemical shark repellents: past, present, and future by Joseph A. Sisneros and Donald R. Nelson. This article was attached to the previous amendment. Please note that this article was published in 2001, and the SCHNEIDER '384 patent is dated July 29, 1986. Clearly, Sisneros and Nelson's article is based on more recent research than was originally available to SCHNEIDER. The journal article states "the anionic alkyl sulfate sodium dodecyl sulfate (SDS) was the most effective in repelling sharks." (Sisneros 3) Sodium dodecyl sulfate, as stated in the previous amendment, is a synonym for sodium lauryl sulfate. The article later states there were two levels of responses measured: "Level 1 was defined as a minimum aversion response (MAR) to the surfactant... Level 2, the vigorous aversion response (VAR), consisted of rapid and exaggerated headshaking, mouth gaping, and either rapid acceleration forward or a 180 degree turnaround." (Sisneros 5 and 6) The MAR level for SDS was 36.4 micrograms per milliliter and the VAR level was 82.6 micrograms per milliliter. (Sisneros Table 2)

By calculation it can be shown that the volume of sodium lauryl sulfate required to obtain a concentration in an

appropriate volume of water at these levels (thereby repelling a shark) far exceeds the volume that could fit in the handle of a dive knife. In fact, the volume of water in which a directional repellent must be dispersed to repel a shark is estimated to be a cone of 3 meters length and 1.5 meter base radius, with the apex of the cone originating at the diver or swimmer actuating the repellent dispenser. This results in a conservative estimate, and may well be less than the amount that would be most prudent.

The amount required to achieve a Vigorous Aversive Response, VAR, would be over twice the amount required to achieve a MAR. Making an intentionally conservative estimate, achieving a concentration at the MAR level (minimum aversion response level) of 36.4 micrograms per milliliter is enough to effectively repel a shark, although a "minimally averted" shark would perhaps not be sufficiently repelled, and a higher concentration of sodium lauryl sulfate would be advisable. Applicant shows below that 245 cubic centimeters of sodium lauryl sulfate is required to achieve a MAR concentration in a cone of these dimensions. The concentration provided by this volume of sodium lauryl sulfate would be present for a short time because of the chemical's dispersion in the turbulence of the sea water. Again, a prudent dose of sodium lauryl sulfate would be greater than 245 cubic centimeters.

The volume of the cone of repellent dispersed in water is calculated to be 7.069 cubic meters, which is equal to 7069 liters of sea water. The desired concentration to achieve MAR is, as previously stated, 36.4 micrograms per milliliter or 0.0364 grams per liter. Multiplying this concentration by the number of liters gives the required mass of sodium lauryl sulfate:

$$(.0364 \text{ g/L}) \times (7069 \text{ L}) = 257.3 \text{ g.}$$

Sodium lauryl sulfate has a specific gravity of 1.05, so that a mass of 257.3 g will be a volume of $(257.31 \text{ g}) / (1.05 \text{ g/cm}^3) = 245 \text{ cm}^3$. This is the volume of sodium lauryl sulfate required to get a minimum aversion response (MAR) from a shark within a small cone of radius 1.5 meters and length 3 meters.

It is clear that this volume, 245 cm^3 , of sodium lauryl sulfate, a single application, cannot fit within the handle of a dive knife. In fact, the 245 cm^3 is roughly the volume of a 12 ounce can of soda. Moreover, a dive knife cannot contain multiple applications of this volume.

Additionally, Applicant's invention as recited in currently amended claim 1 must be "internally incorporated into said rescue flotation buoy during use." Please note that FIGURE 1, and original specification page 3, lines 20-23, and page 5, lines 9-11, 16-19 refer to this "internal incorporation." According to Applicant's invention, the repellent apparatus must be internally attached to the buoy during use. This structure prevents the invention from being dropped into the water in a rescue situation. It also prevents the invention from sinking. A combination of the flotation device according to ILER, the knife according to GB 2 176 732A and the surfactant according to SCHNEIDER '384 is different from this claimed structure. A knife filled with a surfactant repellent is inherently not attached to a flotation buoy that includes a container, as recited in ILER, and must be taken out of the container buoy during use. In this situation, it could be easily dropped into the water.

Since GB 2 176 732A could not contain enough volume of a surfactant such as sodium lauryl sulfate to be effective, and a combination of GB 2 176 732A, ILER and SCHNEIDER '384 would not produce an internally incorporated repellent apparatus during use, it is believed that GB 2 176 732A does not anticipate the invention nor render it obvious in a 35 U.S.C. §103 sense. The rejection of claims 1, 4, 5 and 6 of the present application has been overcome. Therefore, Applicant respectfully traverses the rejection of claims 1, 4, 5 and 6 under 35 U.S.C. §103(a) as being unpatentable over ILER in view of GB 2 176 732A and SCHNEIDER '384.

Claim 11 was rejected under 35 U.S.C. §103(a) as being unpatentable over GB 2 176 732A in view of SCHNEIDER '384. The Examiner cites SCHNEIDER '384 column 2, lines 33 - 37 where "it is disclosed that sodium lauryl when mixed with sea water can kill a shark in only small quantities." However, as shown above, the quantity that is required to repel a shark is actually significantly more than can feasibly fit in the handle of a dive knife. Claim 11 has been amended to recite that fact that the dispensing means serially dispenses multiple applications and "each one of said multiple applications is effective in repelling a shark." Applicant respectfully traverses the rejection of claim 11 under 35 U.S.C. §103(a) as being anticipated by GB 2 176 732 A in view of SCHNEIDER '384.

Finally, claims 7, 8 and 10 were rejected under 35 U.S.C. §103(a) as being unpatentable over SABO in view of KEA, GB 2

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176 732A and SCHNEIDER '384. Once again, GB 2 176 732A could not contain enough volume of a surfactant such as sodium lauryl sulfate to be effective in one application. The Examiner again cites SCHNEIDER '384 column 2, lines 33 - 37 where "it is disclosed that sodium lauryl sulfate when mixed with sea water can kill a shark in only small quantities." Once again, claim 7 has been amended to recite that fact that the dispensing means serially dispenses multiple applications and "each one of said multiple applications is effective in repelling a shark." Applicant respectfully traverses the rejection of claims 7, 8 and 10 under 35 U.S.C. §103(a) as being anticipated by SABO in view of KEA, GB 2 176 732A and SCHNEIDER '384.

In accordance with MPEP §2141, the GRAHAM factual inquiries, objective evidence and secondary considerations. Applicant has received a positive response from the United States Navy and the Japanese Air Rescue Service. An email documenting the support of the Tokyo Fire Department is attached as an Appendix, showing the commercial interest in this invention, over the existing prior art.

In view of the foregoing amendments and remarks, Applicant respectfully requests that claims 1, 4 - 8, and 10 - 11 be allowed and the application be passed to issue.

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On 5/16/05
(Date of Deposit)

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APPENDIX - Email documenting commercial support for invention

Re: H-560CIP

From safespeed2000@yahoo.com (David Schneider)

To edward.vytlacil@marklevylaw.com (Edward J. Vytlacil)

Cc

Date Saturday, March 12, 2005 05:11 PM

Ed the following is the letter sent to me regarding our product.

Thank you,

David

Dear David:

Your product has been accepted by Tokyo Fire Department.

We can sell your products as regularly for all other 52 Fire Department in Japan now.

Please see attached file for creation of label for customer in Japan. We did created this for you.

We are now needed to translate your information into Japanese.

Sincerely Yours,

Yasuhiro Kato

Senior Vice President

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